



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| | | | | |
|-----------------------------------|-------------|----------------------|---------------------|------------------|
| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
| 10/562,932 | 02/09/2006 | Yutaka Murakami | L9289.05197 | 3690 |
| 52989 | 7590 | 12/05/2008 | EXAMINER | |
| Dickinson Wright PLLC | | | NGUYEN, LEON VIET Q | |
| James E. Ledbetter, Esq. | | | ART UNIT | PAPER NUMBER |
| International Square | | | 2611 | |
| 1875 Eye Street, N.W., Suite 1200 | | | MAIL DATE | DELIVERY MODE |
| Washington, DC 20006 | | | 12/05/2008 | PAPER |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | |
|------------------------------|--|-------------------------|
| Office Action Summary | Application No. | Applicant(s) |
| | 10/562,932 | MURAKAMI ET AL. |
| | Examiner LEON-VIET Q. NGUYEN | Art Unit 2611 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If no period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 31 July 2006.

2a) This action is FINAL. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 9-25 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) Claim(s) _____ is/are allowed.

6) Claim(s) 9-25 is/are rejected.

7) Claim(s) _____ is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on 30 December 2005 is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some * c) None of:

1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) Notice of References Cited (PTO-892)

2) Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) Information Disclosure Statement(s) (PTO-166/08)
 Paper No(s)/Mail Date 12/30/05.

4) Interview Summary (PTO-413)
 Paper No(s)/Mail Date. _____.

5) Notice of Informal Patent Application

6) Other: _____.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on 12/30/05 was filed after the mailing date of 12/30/05. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. **Claims 9-11, 13, and 15-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bjerke et al (US20070064831) in view of Belotserkovsky et al (US6650617).**

Re claim 9, Bjerke teaches a communication apparatus comprising:

a first modulation section (elements 222a, 224a, and 226a in fig. 2B) that modulates first transmit data (the output from element 214a in fig. 2B) and obtains a first modulated signal (the output of element 226a in fig. 2B);

a second modulation section (elements 222t, 224t, and 226ta in fig. 2B) that modulates second transmit data (the output from element 214t in fig. 2B) and obtains a second modulated signal (the output of element 226t in fig. 2B); and

a plurality of antennas that transmit said first and second modulated signals (antennas 124a-124t in fig. 2B);

wherein said first modulation section has:

a first mapping section (element 222a in fig. 2B) that maps said first transmit data at a signal point position of a predetermined modulation method (¶0039); and a phase rotation section (element 224a in fig. 2B) that changes a mode of signal point arrangement (¶0042, the IFFT changes each symbol vector into its time domain representation); and

said second modulation section has a second mapping section (element 222t in fig. 2B) that maps said second transmit data at a signal point position of a predetermined modulation method (¶0039).

Bjerke fails to teach wherein the phase rotation section changes a phase of a mapped signal point in a time direction or in a frequency direction. However Belotserkovsky teaches wherein the phase rotation section (elements 56 and 64 in fig.

5) changes a phase of a mapped signal point in a time direction or in a frequency direction (col. 4 lines 39-43).

Therefore taking the combined teachings of Bjerke and Belotserkovsky as whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the feature of Belotserkovsky into the apparatus of Bjerke. The motivation to combine Belotserkovsky and Bjerke would be to avoid a discrete phase jump that could disturb the tracking ability (col. 4 lines 51-53 of Bjerke).

Re claim 10, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 9. The mutually different signal points would be caused by the phase rotation section as taught by Belotserkovsky in claim 1. Furthermore, Bjerke teaches repeating portions of OFDM symbols, which is well known in the art (¶0007 of Bjerke). It would be obvious to modulate each of the repeated OFDM symbols. Also, since the second modulation section of claim 1 has a predetermined modulation method that is not phase rotated, it is interpreted that the signal point arrangement remains unchanged.

Re claim 11, the modified invention of Bjerke teaches a communication apparatus wherein said first modulation section (elements 222a, 224a, and 226a in fig.

2B of Bjerke) forms modulated signals with an identical modulation method (¶0044 of Bjerke) and having a mutual phase difference from identical data as said first modulated signal (elements 56 and 64 in fig. 5 of Belotserkovsky. The phase difference circuit would cause a phase difference with respect to the first signal).

Re claim 13, the modified invention of Bjerke teaches a communication apparatus wherein said first modulation section (elements 222a, 224a, and 226a in fig. 2B of Bjerke) comprises: a mapping section that maps said first transmit data at a signal point position of a predetermined modulation method (elements 222a in fig. 2B of Bjerke, it would be obvious to select a modulation method); and a phase rotation section elements 56 and 64 in fig. 5) that rotates a phase of a mapped signal point through an angle (col. 4 lines 39-43, it is well known that phases are rotated at a particular angle) in accordance with a number of times of transmission of said identical data (although not explicitly taught, it would be obvious to rotate the phase of the signal for each transmission).

Re claim 15, the modified invention of Bjerke teaches a communication apparatus according further comprising an interleaver that interleaves said first and/or said second transmit data (interleavers 214a and 214t in fig. 2B of Bjerke); wherein said first modulation section modulates data after interleaving (fig. 2B of Bjerke), changing a

mode of signal point arrangement (¶0042 of Bjerke, the IFFT changes each symbol vector into its time domain representation).

Re claim 16, the modified invention of Bjerke teaches a communication apparatus further comprising a receiving section (RCVR in elements 124a and 124t in fig. 1 of Bjerke) that receives feedback information indicating a reception state of said first and/or said second modulated signal from a communicating party (¶0043 of Bjerke. The channel conditions sent back to the transmitter system); wherein said first modulation section changes a mode of signal point arrangement based on said feedback information (¶0043 of Bjerke, the coding and modulation schemes may be selected based on the channel conditions).

Re claim 17, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 1. It would be obvious and necessary to have a method of using the apparatus as claimed in claim 1.

Re claim 18, the modified invention of Bjerke teaches a communication apparatus further comprising an orthogonal frequency division multiplexing section that

performs orthogonal frequency division multiplexing of signals output from said first and said second modulation sections (¶0043 of Bjerke, a MIMO-OFDM system).

Re claim 19, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 15.

Re claim 20, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 16.

Re claim 21, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 18.

Re claim 22, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 10. It would be necessary to have a method of using the apparatus as claimed in claim 10.

Re claim 23, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 11.

Re claim 24, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 12.

Re claim 25, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 13.

3. Claims 12 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bjerke et al (US20070064831) and Belotserkovsky et al (US6650617) in view of Medlock et al (US7233810).

Re claim 12, the modified invention of Bjerke teaches a communication apparatus wherein said first modulation section forms QPSK modulated signals (¶0039 of Bjerke, QPSK modulation scheme).

Bjerke fails to teach wherein the modulated signals have a mutual 45 degree phase difference from identical data as said first modulated signal. However Medlock teaches QPSK modulated signals have a mutual 45 degree phase difference from identical data as a first modulated signal (col. 19 lines 6-8).

Therefore taking the modified teachings of Bjerke and Beltserkovsky with Medlock as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the feature of Medlock into the apparatus of Bjerke and Belotserkovsky. The motivation to combine Medlock, Belotserkovsky, and Bjerke would be to overcome the limitations of pushing data through a communication device to a transmitter (col. 3 lines 50-52).

Re claim 14, the modified invention of Bjerke teaches a communication apparatus wherein said first modulation section (elements 222a, 224a, and 226a in fig. 2B of Bjerke) comprises: a mapping section that maps said first transmit data at a signal point position of a predetermined modulation method (elements 222a in fig. 2B of Bjerke, it would be obvious to select a modulation method); and a phase rotation section (elements 56 and 64 in fig. 5) that rotates a phase of a mapped signal point through an angle (col. 4 lines 39-43, it is well known that phases are rotated at a particular angle) in accordance with a number of times of transmission of said identical data (although not explicitly taught, it would be obvious to rotate the phase of the signal for each transmission).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LEON-VIET Q. NGUYEN whose telephone number is

(571)270-1185. The examiner can normally be reached on monday-friday, alternate friday off, 7:30AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David C. Payne can be reached on 571-272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Leon-Viet Q Nguyen/
Examiner, Art Unit 2611

/David C. Payne/
Supervisory Patent Examiner, Art Unit 2611